

IN THE CLAIMS:

1 1. Cancelled

1 2. Cancelled

1 3. (Currently Amended) The method of determining resistance, as defined in ~~claim~~
2 ~~2-claim 17~~ including the further step of
3 evaluating any changes in said calculated resistance over time as a measure of
4 fuel cell hydration.

1 4. (Currently Amended) ~~A~~The method of determining resistance in a fuel cell, ~~as~~
2 ~~defined in claim 1, including the further steps of~~comprising the steps of:
3 (A) switching a fixed resistance load onto said fuel cell;
4 (B) allowing ~~at~~the fuel cell stack voltage to stabilize at a first voltage level;
5 (C) removing the fixed resistance;
6 (D) substantially immediately measuring ~~at~~the new stack voltage; and
7 (E) calculating the fuel cell resistance based upon the change between the first
8 voltage level and the new stack voltage.

- 1 | 5. (Currently Amended) ~~A~~ The method of determining resistance in a fuel cell as
2 | ~~defined in claim 1 including the further comprising the steps of:~~
- 3 | (A) providing a DC-DC converter with an associated microcontroller;
4 | (B) adjusting input parameters of said DC-DC converter, using said microcon-
5 | troller, to establish an initial duty cycle;
6 | (C) reading ~~at~~ the stack voltage and the stack current;
7 | (D) changing the duty cycle;
8 | (E) substantially immediately measuring the fuel cell voltage and fuel cell cur-
9 | rent; and
10 | (F) calculating resistance based upon measurements.
- 1 | 6. (Currently Amended) The method of determining resistance, as defined in ~~claim~~
2 | ~~1 including claim 5 comprising the further step of~~
3 | evaluating any changes in resistance over time as a measure of fuel cell hydration.
- 1 | 7. (Currently Amended) The method of determining resistance, as defined in ~~claim~~
2 | ~~4~~ claim 5, wherein said fuel cell comprises one of the following:
3 | (A) a fuel cell stack;
4 | (B) a fuel cell array; and
5 | (C) an individual fuel cell.
- 1 | 8. (Currently Amended) The method of determining resistance, as defined in ~~claim~~
2 | ~~3~~ claim 7, wherein a fuel cell in said fuel cell stack, said fuel cell array, or said individual
3 | fuel cell is a direct oxidation fuel cell.
- 1 | 9. (Currently Amended) The method of determining resistance, as defined in ~~claim~~
2 | ~~4~~ claim 8, wherein said direct oxidation fuel cell is a direct methanol fuel cell.

1 10. (Currently Amended) The method of determining resistance, as defined in ~~claim~~
2 claim 7, wherein a fuel cell in said fuel cell stack, said fuel cell array, or said individual
3 fuel cell is a hydrogen fuel cell.

1 11. – 14. Cancelled

1 15. (Original) A method of measuring resistance in a fuel cell stack being used as a
2 power source, comprising the steps of:

3 (A) using a fuel cell stack to produce power that can be supplied to a battery or
4 load;

5 (B) switching a fixed load across said fuel cell stack;

6 (C) reading the voltage across the stack after a predetermined time period
7 when said fixed load circuit is on;

8 (D) turning off the load;

9 (E) substantially immediately reading the stack voltage; and

10 (F) determining stack resistance based upon a change in said stack voltage
11 readings.

1 16. (Original) A method of measuring resistance across a direct oxidation fuel cell
2 stack that includes programmable DC-DC switches including the steps of:

3 (A) using said programmable DC-DC switches to switch a load on and off said
4 fuel cell stack;

5 (B) signaling an associated microprocessor under pulse-width modulation con-
6 trol to adjust the duty cycle of said DC-DC switches

7 (C) measuring voltage changes as said switches change;

8 (D) calculating a change in resistance over time; and

9 (E) predicting cell hydration based upon said changes.

1 17. (New) A method of determining resistance in a fuel cell, including the steps of:

2 (A) measuring an initial stack current and stack voltage;

3 (B) coupling constant current with the fuel cell to set stack current using a
4 constant current sink having an operational amplifier configured to receive a con-
5 trol voltage as an input and coupled at an output to a power transistor, and having
6 a second input couple between said power transistor and a sense resistor;

7 (C) waiting a predetermined time period for the output voltage of the fuel cell
8 to stabilize;

9 (D) measuring the output voltage of the fuel cell;

10 (E) changing the fuel cell current using said constant current sink;

11 (F) substantially immediately reading the output voltage of the fuel cell; and

12 (G) calculating the resistance of the fuel cell.